BSC 307 Science Literacy Lesson Plan Form

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| Title: Animal and Plant Cell Observational Study | Grade Level: 9 |
| Objectives: TSWBAT:   * Identify the various structures that exist in plant and animal cells. * Synthesize a hypothesis regarding the response of the animal and plant cells to a hypertonic and hypotonic solution. | |
| Illinois State Learning Standards:  State Goal #11 – Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.   * 11.A.4b: Conduct controlled experiments or simulations to test hypotheses. * 11.A.4c: Collect, organize, and analyze data accurately and precisely. * Descriptor Stage I – 12A-2: Apply scientific inquiries or technological designs to analyze the cellular organelles and functions, using different microscopic techniques, explaining functional processes chemically and structurally. | |
| Science Literacy Skills:  The student will learn how to properly make predictions, write a hypothesis, test the hypothesis, and determine whether or not their results support the hypothesis. Students will also learn how to conduct research with only basic guidelines. | |
| Activity Description:  The student will observe plant and animal cells under a microscope. The student will then attempt to draw whatever structures they see and determine their functions on the given worksheet. Once this is complete for both plant and animal cells, each student will make predictions based on what they think will happen when the cells are introduced to a hypotonic solution and a hypertonic solution. Make sure to explain to students that there is no wrong answer when it comes to writing hypotheses as long as you follow the correct structure. Using a paper towel, the student will then draw a drop of salt solution and a drop of distilled water under each of the slides. They will then observe and record their findings on the worksheet, drawing diagrams of the cells that they see. After the lab is complete, the class will come together and we will have a closing conversation about what actually happens to cells under hypotonic and hypertonic solutions. Doing this will help either reinforce the students hypothesis or have then understand further why their hypothesis was not supported. | |
| Assessment Strategies:  Using the worksheet, we will be able to determine whether or not the student was able to really see the structures presented on the cells and whether or not they were able to understand what the functions of these structures were. Also, using the worksheet, we will be able to see what type of hypotheses the students are writing and what they are predicting will happen on a cellular level. | |
| Rationale:  Actually observing a cell and its functions is very useful in turning an abstract concept into a concrete one. Once the students see what they have been learning about would be beneficial for their inspiration to pursue further education on the topic. Another important component of this activity is being able to develop a refined hypothesis. Being able to make predictions for what will happen and why these things happen is a skill that is key in mastering scientific exploration. | |
| Resources:  Chapter 7: Cell Structure and Function. From the given textbook packet. (Probably a Pearson Textbook) | |

\* Please attach any and all handouts/worksheets to this lesson plan

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| Title: Cell Disorder Research Project - Research |
| Objectives: TSWBAT:   * Analyze current research on a given cell disorder. * Find the given cell disorder’s status in the news. | |
| Illinois State Learning Standards:  State Goal #12 - Understand the fundamental concepts, principles, and interconnections of the life, physical and earth/space sciences.   * 13.A.4b: Assess the validity of scientific data by analyzing the results, sample set, sample size, similar previous experimentation, possible misrepresentation of data presented and potential sources of error. * Descriptor Stage H – 13A-2: Apply scientific habits of mind to curricular investigations in life, environmental, physical, earth, and space sciences, evaluating evidence, inferring statements based on data, questioning sources of information, explaining necessity of manipulating only one variable at a time, or retrieving mathematical data accurately for scientific analysis. | |
| Science Literacy Skills:  The student will learn how to read primary scientific articles and how to attain the information they need from a very complex piece of literature. The student will also be required to observe the status of their topic in the news and thus showing them the public spotlight that exists over their topic. | |
| Activity Description:  This is the lesson plan for the first day of multiple research days for this project. After a short introduction in cell disorders, the students will be split off into groups of three. Each group member will have a role where they will investigate multiple components of cell disorders. The students will: look at what happens to the cell to make it function abnormally, determine how the disorder is treated today, find cutting edge research that has recently taken place, establish the current status of the disorder in recent news. The “cutting edge research” that is taking place on their topic will be coming from primary literature sources. Using a scholarly search engine like Google Scholar will suffice. The student must site their sources correctly and diligently. Topics in the news should be covered on reputable news websites or newspapers and not on blogging sites or other non-official news sites. The students must be observed while doing their research to ensure that there is little off task behavior. Students will use the provided worksheet to collect data and record beneficial resources for later use. By the end of the class period the students should have a good mindset of their role within the group and a good idea of where they are going with their topic. At the end of the first research day collect their note sheets to assess their research so far. | |
| Assessment Strategies:  Providing a note sheet will allow us to determine whether or not the student actively took knowledge from the primary research instead of just the common solutions. Also, this will also allow us to compare their work to the work of their group members. We must keep in mind that some students take notes differently and that just because there may be less notes on a worksheet, that doesn’t mean that the other student wasn’t working. | |
| Rationale:  The ability to learn how to truly research a topic to determine the most supported information is something that is often lacking in research at the high school level. Research is mostly related to Wikipedia or Google. In this activity students will be comparing the primary research to what is going on in the news, a vital skill when they are looking to seek the most accurate and unbiased answer when it comes to a given topic such as cell disorders. This activity also allows students to develop their communication skills as a group. Communication is one of the most important skills a student can learn throughout their high school career. Without a strong level of communication they will most likely experience a great deal of difficulty when finding an occupation after high school. | |
| Resources:  None – I came up with this lesson | |

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| Title: Cell Disorder Research Project - Presentation |
| Objectives: TSWBAT:   * Report their researched information to a group of their peers. * Explain the current research that is taking place in reference to their topic, and the current standing of their topic in the news. | |
| Illinois State Learning Standards:  State Goal #12 - Understand the fundamental concepts, principles, and interconnections of the life, physical and earth/space sciences.   * 12.A.4b: Describe the structures and organization of cells and tissues that underlie basic life functions including nutrition, respiration, cellular transport, biosynthesis and reproduction. * Descriptor Stage H –11A-5: Report, display and defend the process and findings of issue investigation, presenting oral or written final report for action response options for peer review, generating further questions or issues for consideration, or evaluating other resolutions or responses for action for applicable correlations, consolidation or explanations. | |
| Science Literacy Skills:  The student will learn how to properly display and explain their research to the class. Student will also be able to communicate which topics will be covered by which student and how to speak in a productive and efficient manner as a group. | |
| Activity Description:  This would be the last day of the cell disorder project. Today each group will present their findings to the class. In a brief 8-10 minute presentation, they will display what they found such as prevalence of the disorder today, importance of the disorder to society, current studies on the disorder, and the disorder’s presence in the news. Each student will be evaluated based on their participation in the discussion and the fulfillment of their role within the group. | |
| Assessment Strategies:  During the group’s presentation we will be able to determine whether or not the student actually found research on their topic, understood where the topic was in the news, and re-envisioned the basic qualities of their topic in their presentation. | |
| Rationale:  Development of the student’s ability to explain and defend their findings is beneficial for any student. Having good communication skills is paramount not only in the working world, throughout the student’s education as well. Being able to speak in front of an audience can build confidence and give the student some of the necessary social skills to succeed. Another beneficial trait that is developed in this activity is cooperation, collaboration, and teamwork within a group. The student will be able to develop their knowledge of the cell by completing their presentation. The most effective way to learn a certain topic is to teach it to others. | |
| Resources:  None | |